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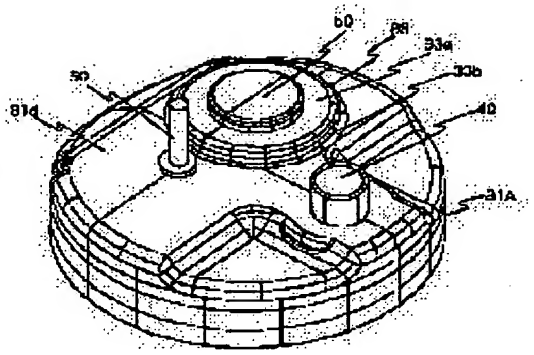
(54) SEALED MOTOR-DRIVEN COMPRESSOR

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a sealed motor-driven compressor using a substitute refrigerant represented by a refrigerant R-410A, suppressing an increase of the thickness of a cover body to the utmost, securing the withstand pressure, and improving the assembling property such as the welding property between the cover body and a terminal or a refrigerant circulation pipe.
SOLUTION: This sealed motor-driven compressor stores a compression mechanism section and a motor section driving the compression mechanism section in a sealed container, the sealed container is formed into a nearly cylindrical shape, and a terminal 50 is coupled with a hole formed on the cover body 31A of the sealed container and is welded to the cover body 31A. The fitting section of the terminal 50 of the cover body 31A of the sealed container and its vicinity are formed into a protruded section 33 built up more than the peripheral flat section 31d of the cover body 31A.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The sealing form electrically-driven compressor characterized by forming the core of the lid of said well-closed container, and its near in a well-closed container at the configuration of one of irregularity in the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid.
[Claim 2] In the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container The sealing form electrically-driven compressor characterized by forming the installation section of said terminal of the lid of said well-closed container, and its near in the configuration of one of irregularity rather than the periphery of this lid.
[Claim 3] In the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container The sealing form electrically-driven compressor characterized by forming the drawing configuration section which has the flat part which rose from the circumference flat part of this lid in the installation section of this terminal, and was divided into the installation section of said terminal of the lid of said well-closed container from said flat part in the shape of an approximately concentric circle.
[Claim 4] In the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container The sealing form electrically-driven compressor further characterized by forming the configuration of one of irregularity also in radial [of said terminal] while forming the installation section of said terminal of the lid of said well-closed container, and its near in the configuration of one of irregularity rather than the periphery of this lid.
[Claim 5] In the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a sealing form electrically-driven compressor, and relates to a refrigerator and the sealing form electrically-driven compressor which adopted the high voltage chamber method used for air-conditioning equipment especially.
[0002]
[Description of the Prior Art] The sealing form electrically-driven compressor which adopted the conventional high voltage chamber method is explained with reference to drawing 4 thru/or drawing 6 . The cylindrical shell of a sealing form electrically-driven compressor and the important section sectional view of a lid where the former of the sectional view in which drawing 4 shows the configuration of the conventional sealing form electrically-driven compressor, and drawing 5 is common, and drawing 6 are the important section sectional views showing the condition that the lid of the conventional sealing form electrically-driven compressor deformed with internal pressure.
[0003] The sealing form electrically-driven compressor shown in drawing 4 is what contains the compression device section 10 and the motor section 20 which drives this compression device section in the cylindrical shell 30 which is the body of a well-closed container. After the refrigerant absorbed from the refrigerant intake pipe 40 was compressed in the compression device section 10, It is once breathed out in a cylindrical shell 30 (well-closed container) from the refrigerant regurgitation port 11 established in the compression device section 10, and it is full in a cylindrical shell 30, is further breathed out from the regurgitation pipe 41, and has the structure (high voltage chamber method) where internal pressure acts on a well-closed container with a refrigerant during operation.
[0004] The cylindrical shell 30 shown in drawing 4 is equipped with the lid 31 which seals nothing and this cylindrical shell 30 for the shape of a cylindrical shape. Moreover, it has the terminal 50 which engaged with the hole formed in the lid 31, and was welded to the lid 31. In order for internal pressure to act with a refrigerant during operation as mentioned above, it is necessary to secure the pressure resistance to the high voltage at the time of operation to this lid 31. Forming a lid in the shape of an abbreviation globular form generally as the cure is known as an ideal configuration.
[0005] However, in a globular form lid, the well-closed container die length of a compressor becomes long, and the inclusion tooth space to a refrigerator machine increases. Moreover, there are the weldability and attachment nature, and when attaching the terminal 50 for supplying electric power to the motor section 20 which drives said compressor device section 10 to a lid or performing the piping 40 for circulation of a refrigerant, and anchoring of 41 grades, problems, such as the moldability of the lid itself, are in a pan. then, it is shown in drawing 5 — as — a lid 31 — abbreviation — he adopts a flat configuration and is trying to raise productivity
[0006] The structure of a well-closed container with the lid of the abbreviation flat configuration shown in drawing 5 is explained. 30 is a cylindrical shell which is a body of a well-closed container, and although not illustrated, said compression device section 10 and said motor section 20 are dedicated to the interior of this cylindrical shell 30. 31 is a lid, and in said

cylindrical shell 30, a weld zone 32 is fixed and it forms the container of a sealing form compressor. 50 is a terminal and is being fixed to the hole formed in the top face of said lid 31 by the weld zone 51.
[0007] Moreover, the terminal pin 52 for the feed on the inside and outside to a motor is arranged in the terminal 50. 40 is a refrigerant absorption pipe and this absorption pipe 40 is being fixed to the lid 31 of said cylindrical shell 30 by the weld zone 41. It is a pin for 60 to fix wrap covering for said terminal 50, and this pin 60 is being fixed to the lid 31 of said cylindrical shell 30 by the weld zone 61. In addition, as advanced technology about the container of the conventional sealing form compressor, the thing JP,64-1495,Y and given in JP,3-57318,B is known.
[0008]
[Problem(s) to be Solved by the Invention] There were the following problems in the structure of such a lid of the conventional sealing form electrically-driven compressor. In recent years, adoption of the alternative refrigerant to frozen air-conditioning equipment is needed for ozone layer depletion prevention, and there are some from which a pressure increases about 1.5 times to the conventional refrigerant under the same temperature condition in the alternative refrigerant so that it may be represented by refrigerant R-410A.
[0009] A refrigerant with such a high pressure is used, and if it comes whenever it is shown in drawing 5 R> 5, and the compressor of the conventional well-closed container is made to operate, as shown in drawing 6 , the abbreviation flat-surface configuration section tends to deform in the shape of a globular form with the internal pressure which acts on a lid 31. For this reason, since the center section of the lid 31 is pulled radially, the board thickness of that center section becomes thin. Moreover, since the force which is going to tear off the weld zone 51 of a lid 31 and a terminal 50 or the weld zone 41 of a lid 31 and the refrigerant absorption pipe 40 increases conventionally, the problem of refrigerant leakage becomes easy to arise.
[0010] Then, although it is possible as a means for solving this problem to raise the board thickness of a lid 31, in order to be able to bear this about 1.5 times as many pressure build-up as this, the thickness of a lid 31 must be increased the conventional ratio and about 2.5 times from the result of examination, and problems, like that shaping of a lid becomes impossible easily and weight becomes heavy arise.
[0011] It is in offering the sealing form electrically-driven compressor which improved assembly nature, such as the weldability of a lid, a terminal and a lid, and a refrigerant circulation pipe, further, having been made in order that this invention might solve the trouble of the above-mentioned conventional technique, and the object of this invention suppressing the increment in the board thickness of a lid as much as possible about the sealing form electrically-driven compressor which uses the alternative refrigerant represented by refrigerant R-410A, and securing pressure-proofing.
[0012]
[Means for Solving the Problem] In order to attain the above-mentioned object, the first configuration of the sealing form electrically-driven compressor concerning this invention In the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container The core of the lid of said well-closed container and its near are formed in the configuration of one of irregularity. In the development process of this invention, although experimented in the core of the lid of a well-closed container, and the thing in which the converging section (an equivalent for a rib) was formed on the lid core approach of a terminal in detail, the effectiveness of stress concentration relaxation was small. Then, the effectiveness of stress concentration relaxation was accepted by forming the converging section in the near further from the core of a lid.
[0013] Moreover, the second configuration of the sealing form electrically-driven compressor built over this invention in order to attain the above-mentioned object In the sealing form electrically-driven compressor which has the terminal which the compression device section and

the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container The installation section of said terminal of the lid of said well-closed container and its near are formed in the configuration of one of irregularity rather than the periphery of this lid.
[0014] The compression device section and the motor section which drives this compression device section are specifically contained in a well-closed container. In the sealing form electrically-driven compressor which has the terminal where said well-closed container engaged with the hole formed in the lid of nothing and said well-closed container, and was welded to the lid in the shape of a cylindrical shape The drawing configuration section which has the flat part which rose from the circumference flat part of this lid in the installation section of this terminal, and was divided into the installation section of said terminal of the lid of said well-closed container from said flat part in the shape of an approximately concentric circle is formed.
[0015] Furthermore, the third configuration of the sealing form electrically-driven compressor built over this invention in order to attain the above-mentioned object In the sealing form electrically-driven compressor which has the terminal which the compression device section and the motor section which drives this compression device section were contained, and said well-closed container engaged with the hole in which the shape of a cylindrical shape was formed at the lid of nothing and said well-closed container, and was welded to the lid in the well-closed container While forming the installation section of said terminal of the lid of said well-closed container, and its near in the configuration of one of irregularity rather than the periphery of this lid, the configuration of one of irregularity is further formed also in radial [of said terminal].
[0016] The compression device section and the motor section which drives this compression device section are specifically contained in a well-closed container. In the sealing form electrically-driven compressor which has the terminal where said well-closed container engaged with the hole formed in the lid of nothing and said well-closed container, and was welded to the lid in the shape of a cylindrical shape To the circumference of the installation section of said terminal in the lid of said well-closed container, and the pin for covering anchoring of said terminal, in the shape of an approximately concentric circle While forming the drawing configuration section which has the flat part which rose from the circumference flat part of said lid, and was divided from said flat part Furthermore, the drawing configuration section which has the flat part which rose from the circumference flat part of said lid to the radial, and was divided into radial [of said terminal] from said flat part is formed.
[0017] In more detail, the climax height of the flat part of the configuration section and the climax height of the flat part of the drawing configuration section prepared in the radial radial [of said terminal] which were prepared in the shape of an approximately concentric circle are made into the same height by extracting, and each climax level difference section is smoothly formed in the circumference of the installation section of said terminal, and the pin for covering anchoring of said terminal.
[0018]
[Embodiment of the Invention] The gestalt of typical operation of this invention is explained with reference to drawing 1 thru/or drawing 3 below. The body configuration of the sealing form electrically-driven compressor in the gestalt of these operations applies to the thing of a general configuration of having been shown in drawing 4 correspondingly. In the sealing form electrically-driven compressor with which the compression device section 10 and the motor section 20 which drives this compression device section were contained in the cylindrical shell 30 which is the body of the well-closed container shown in drawing 4 After being compressed in the compression device section 10, the refrigerant absorbed from the refrigerant intake pipe 40 is once breathed out in a cylindrical shell 30 from the refrigerant regurgitation port 11 established in the compression device section 10, and it is full of it in a cylindrical shell 30, and it is further breathed out from the regurgitation pipe 41. For this reason, in the well-closed container, it has during operation the structure where internal pressure acts, with the refrigerant.
[0019] Here, the case where allowance pressure-proofing makes the conventional ratio and the internal pressure of about 43 about 1.5 times as many Kgf/cm2 as this act as equivalent to

refrigerant R-410A to the conventional lid of R-refrigerant 22 response is explained. The conventional lid 31 shown in drawing 5 carries out press working of sheet metal of the steel plate, manufactures it, and fixes the terminal 50 for supplying electric power to the motor section further, and the intake piping 40 of a refrigerant by welding.

[0020] It follows on the lid 31 which was an abbreviation flat side making internal pressure act before application of pressure, and it deforms so that the core of a lid 31 may become a convex surface, as shown in drawing 6 . At this time, since the projected net area of that there is an inclination for board thickness to become [the core of a lid 31 / deformation] large thinly compared with that periphery, and a terminal 50 is smaller than a lid, from the reasons nil why the rigidity of a terminal 50 is high etc., stress concentration will occur in a weld zone and we are [/ near the lid core] anxious about lowering of dependability.

[0021] In order to solve this problem, it is possible to raise the board thickness of a lid, but in order to be able to bear this about 1.5 times as many pressure build-up as this, problems, like that must increase the thickness of a lid the conventional ratio and about 2.5 times, and shaping of a lid becomes impossible easily, that weight becomes heavy, and a production cost becomes size arise. Then, the example of the lid which also solved the problem of assembly nature, such as the weldability of a lid, a terminal and a lid, and a refrigerant circulation pipe, further is shown below, securing pressure-proofing without increasing the board thickness of a lid as much as possible.

[0022] [Gestalt 1 of operation] With reference to drawing 1 , the example of the cure is shown as a gestalt of the 1st operation. Drawing 1 is the perspective view of the lid of the sealing form electrically-driven compressor in which the gestalt of operation of the 1st of this invention is shown. In drawing 1 , the thing of the same sign as drawing 5 shows the bill of materials and the equivalent section of a lid of the conventional technique. Drawing 1 which is the perspective view of a lid is equivalent to mesh division drawing in the stress analysis of this operation gestalt, and the line in drawing shows the model line which divided a mesh. In addition, drawing 2 and drawing 3 R> 3 which are explained later are also equivalent to mesh division drawing similarly.

[0023] Lid 31A shown in drawing 1 forms the convex configuration section 33 in concentric circular [which rose around the terminal 50 of the lid which was an abbreviation flat configuration conventionally rather than 31d of circumference flat parts of this lid 31A]. The convex configuration section 33 forms the drawing configuration section which has flat part 33a which rose from 31d of circumference flat parts of lid 31A, and was divided from 31d of said flat parts, and has smooth level difference section 33b. The drawing configuration section functions as a rib.

[0024] By forming the convex configuration section 33 in concentric circular [which rose rather than 31d of circumference flat parts of a lid], the circumference flat part of a terminal 50 is distributed by flat part 33a of the convex configuration section 33, and a projected net area is distributed. Therefore, the stress concentration of terminal 50 periphery produced conventionally will be eased. As a result of this configuration modification, the amount of strains could be conventionally made into 10% or less of ratios, and the deformation of lid 31A was able to be stopped substantially.

[0025] [Gestalt 2 of operation] Next, the gestalt of the 2nd operation is explained with reference to drawing 2 . Drawing 2 is the perspective view of the lid of the sealing form electrically-driven compressor in which the gestalt of operation of the 2nd of this invention is shown. In drawing 2 , the thing of the same sign as drawing 5 is the bill of materials and the equivalent section of a lid of the conventional technique, and the thing of the same sign as drawing 1 shows the gestalt and the equivalent section of the 1st operation. Lid 31B shown in drawing 2 forms the convex configuration section 34 in concentric circular around the pin 60 for fixing wrap covering to the surroundings of a terminal 50 for a terminal 50, outside it formed the convex configuration section 33 in concentric circular [which rose rather than 31d of circumference flat parts of this lid 31B].

[0026] The convex configuration section 33 of the circumference of said terminal and the convex configuration section 34 of the circumference of said pin 60 form the drawing configuration section which has the flat parts 33a and 34a which rose from 31d of circumference flat parts of

lid 31B, respectively, and were divided from 31d of said flat parts, and has the respectively smooth level difference sections 33b and 34b and to carry out. The flat parts 33a and 34a of these convex configuration sections 33 and 34 are formed in abbreviation same height.
[0027] Thus, it not only suppresses the stress concentration of terminal 50 periphery, but there is effectiveness which controls deformation of the whole lid 31B further like the gestalt of the 1st operation by forming the convex configuration section. Consequently, it can suppress that a lid 31 swells in the shape of a globular form as much as possible like the conventional technique shown in drawing 6 . For this reason, as shown in drawing 6 , the sense of the absorption pipe 40 can incline or aggravation of the adhesion to the lid of wrap covering can be suppressed for the terminal 50 by a pin 60 inclining.
[0028] [Gestalt 3 of operation] Next, the gestalt of the 3rd operation is explained with reference to drawing 3 . Drawing 3 is the perspective view of the lid of the sealing form electrically-driven compressor in which the gestalt of operation of the 3rd of this invention is shown. In drawing 3 , the thing of the same sign as drawing 5 is the bill of materials and the equivalent section of a lid of the conventional technique, and since the thing of the same sign as drawing 1 is the gestalt and the equivalent section of the 1st operation, it omits the explanation.
[0029] Lid 31C shown in drawing 3 forms the convex configuration section 33 in concentric circular [which rose rather than 31d of circumference flat parts of this lid], and forms in the surroundings of a terminal 50 the convex configuration sections 35a, 35b, and 35c of plurality (the gestalt of this operation three directions) including the surrounding convex configuration section of a pin 60 further extended to radial [of said terminal 50] at a radial. The convex configuration sections 35a, 35b, and 35c form the drawing configuration section which has the flat part which rose to the radial from 31d of circumference flat parts of said lid 31C, and was divided into radial [of a terminal 50] from 31d of said flat parts, and has the respectively smooth level difference section. These convex configuration sections 33, 35a, 35b, and 35c are formed in the heights of abbreviation same height.
[0030] Since it can distribute further rather than the gestalt of the 2nd operation of the projected net area of lid 31C, the gestalt of operation shown in drawing 3 can stop the deformation of lid 31C further. In addition, with each above-mentioned operation gestalt, although the drawing configuration section showed the example of a convex configuration, when it is made a concave configuration, compared with a convex configuration, it it not only can expect the same effectiveness as a convex configuration, but can stop the die length of a well-closed container further. In this way, without making a lid into the spherical surface, by securing a flat side, the reinforcement of the connection of a terminal 50 and the circulating-pump piping 40 of a refrigerant can be secured, and raw material thickness can be controlled to the minimum, and a lightweight and compact sealing form electrically-driven compressor can be offered.
[0031] In the sealing form electrically-driven compressor which uses alternative refrigerants, such as refrigerant R-410A, according to each above-mentioned operation gestalt By suppressing the increment in the board thickness of a lid as much as possible, and solving the crack of the weld zone of a lid, a terminal or a lid, and a refrigerant absorption pipe, and the problem of refrigerant leakage by preparing a concavo-convex configuration in the lid of the conventional abbreviation flat configuration in part The pressure resistance which can bear high voltage refrigerants, such as refrigerant R-410A, is realized, and components installation nature and assembly nature are good, are still lightweight and cheaper, and can offer the sealing form compressor possessing a reliable lid.
[0032]
[Effect of the Invention] The sealing form electrically-driven compressor which improved assembly nature, such as the weldability of a lid, a terminal and a lid, and a refrigerant circulation pipe, further can be offered suppressing the increment in the board thickness of a lid as much as possible, and securing pressure-proofing about the sealing form electrically-driven compressor which uses the alternative refrigerant represented by refrigerant R-410A, according to this invention, as explained to the detail above.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view of the lid of the sealing form electrically-driven compressor in which the gestalt of operation of the 1st of this invention is shown.
[Drawing 2] It is the perspective view of the lid of the sealing form electrically-driven compressor in which the gestalt of operation of the 2nd of this invention is shown.
[Drawing 3] It is the perspective view of the lid of the sealing form electrically-driven compressor in which the gestalt of operation of the 3rd of this invention is shown.
[Drawing 4] It is the sectional view showing the configuration of the conventional sealing form electrically-driven compressor.
[Drawing 5] They are the cylindrical shell of the conventional common sealing form electrically-driven compressor, and the important section sectional view of a lid.
[Drawing 6] The lid of the conventional sealing form electrically-driven compressor is the important section sectional view showing the condition of having deformed with internal pressure.
[Description of Notations]
10 [— A lid, 31d / — A circumference flat part, 33, 34, 35a, 35b 35c / — The convex configuration section, 33a, 34a / — A flat part, 33b, 34b / — The level difference section, 40 / — An absorption pipe, 50 / — A terminal, 60 / — Pin.] — The compression device section, 20 — The motor section, 30 — A cylindrical shell, 31, 31A, 31B, 31C

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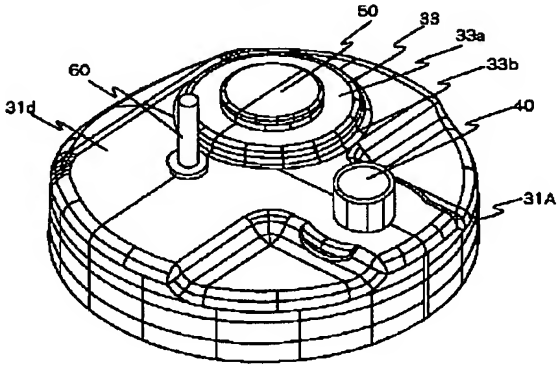
DRAWINGS

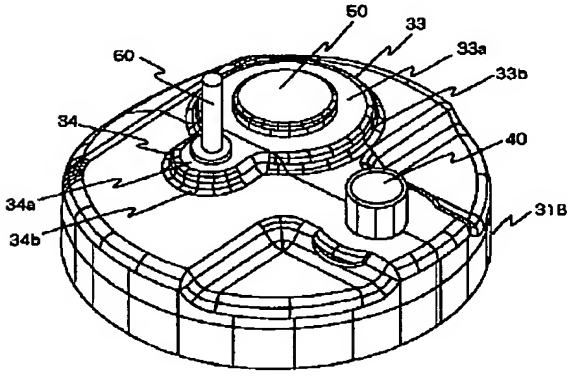
[Drawing 1]

図 1



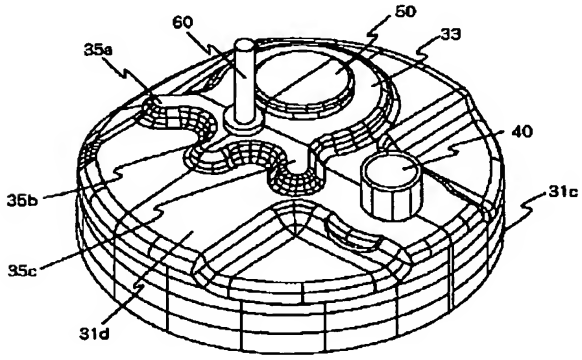
[Drawing 2]

図 2



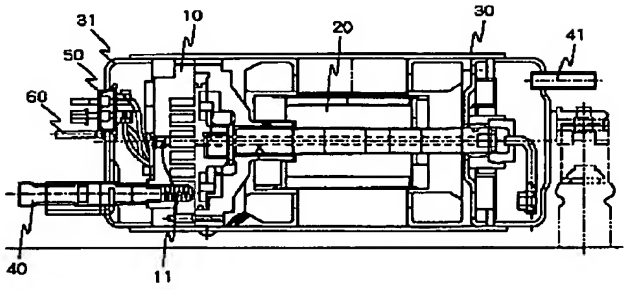
[Drawing 3]

図 3



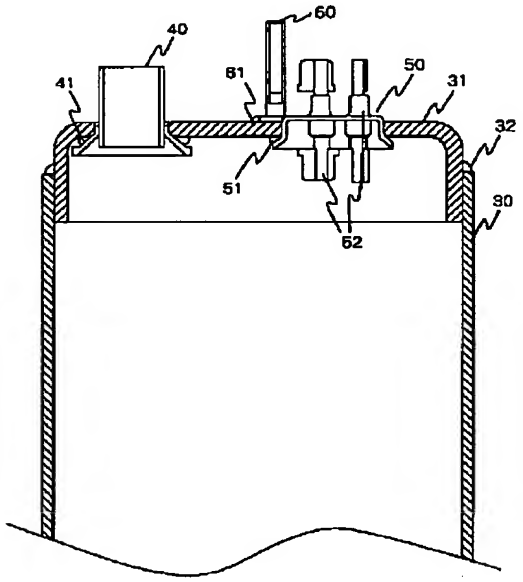
[Drawing 4]

図 4



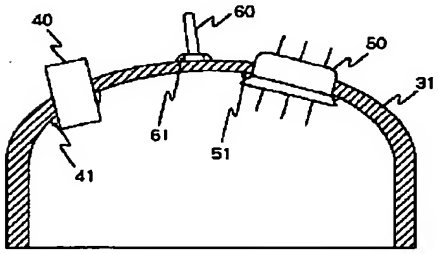
[Drawing 5]

図 5



[Drawing 6]

図 6



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